



Korean STI Strategy for Industrial Development and Policy Implications for Chile

Presented at

*Korean Innovation Policy Week
Santiago, Chile*

October 9, 2015

Yongsuk Jang, Ph.D.

Senior Research Fellow
jang@stepi.re.kr



Contents

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Republic of Korea (South)

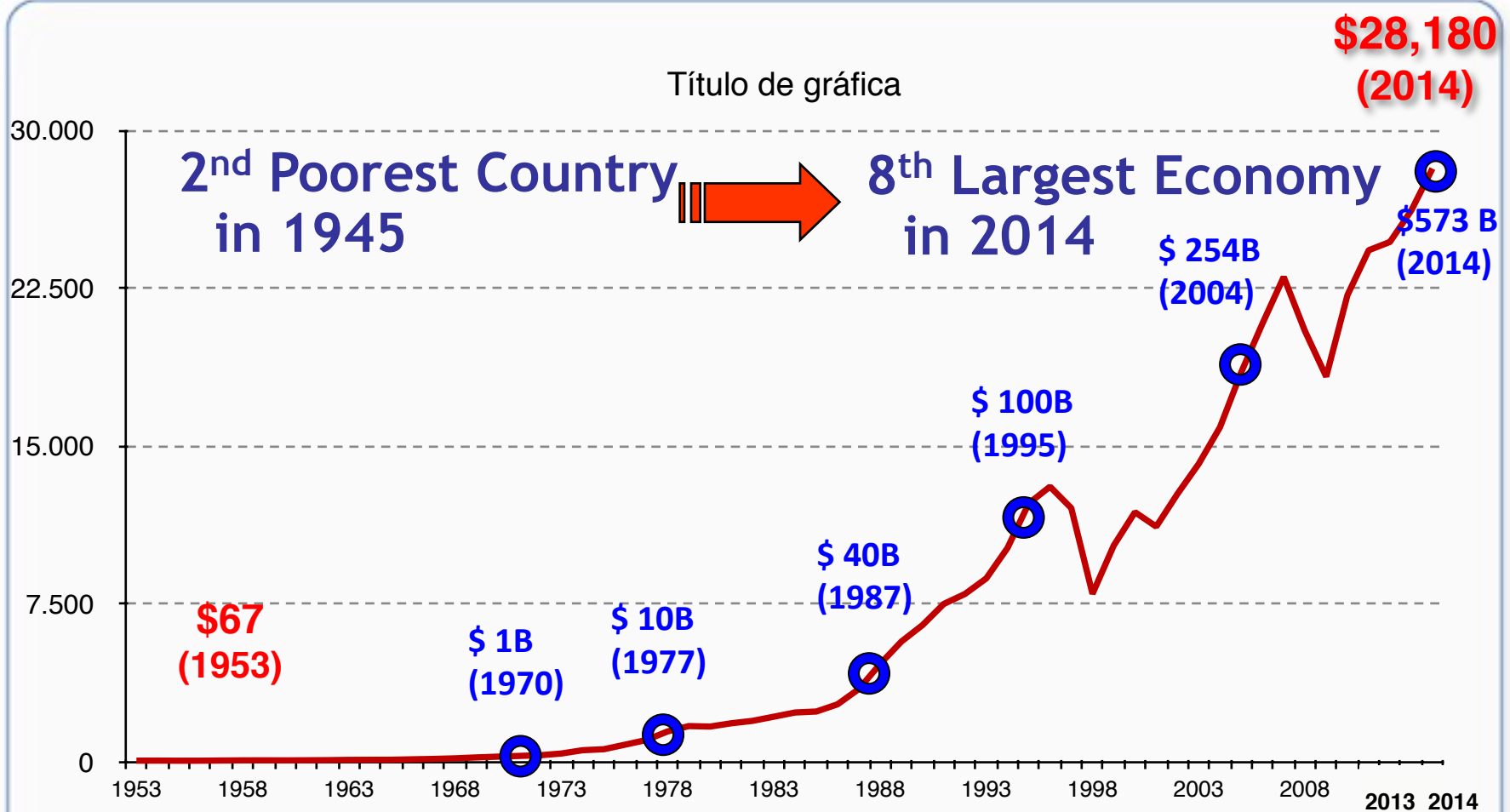
Political Map of the World, April 2000



A Small Land with Scarce Resource



Korea's Economic Development, 1953-2013



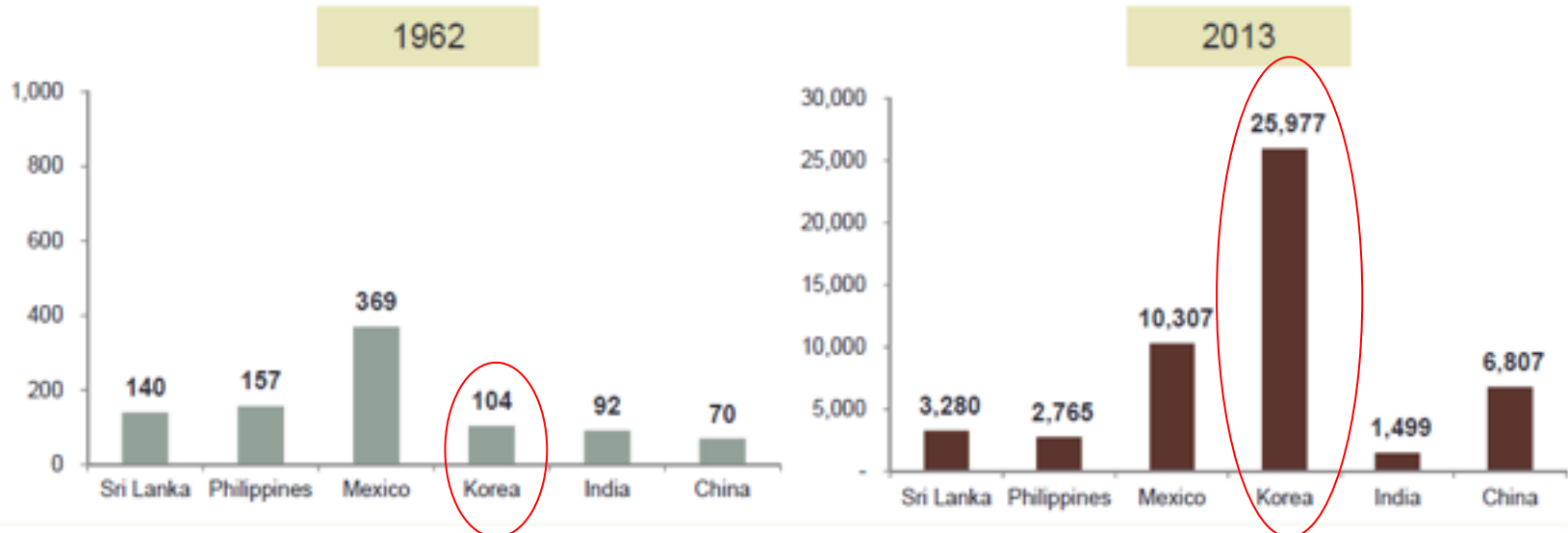
- 1953-1970: Per Capita GNP (current US\$, 1975 base year)
- 1971-2010: Per Capita GNI (current US\$, 2005 base year)

■ Korean Economic Growth in Comparison

Korean Experience: From Poverty to Prosperity

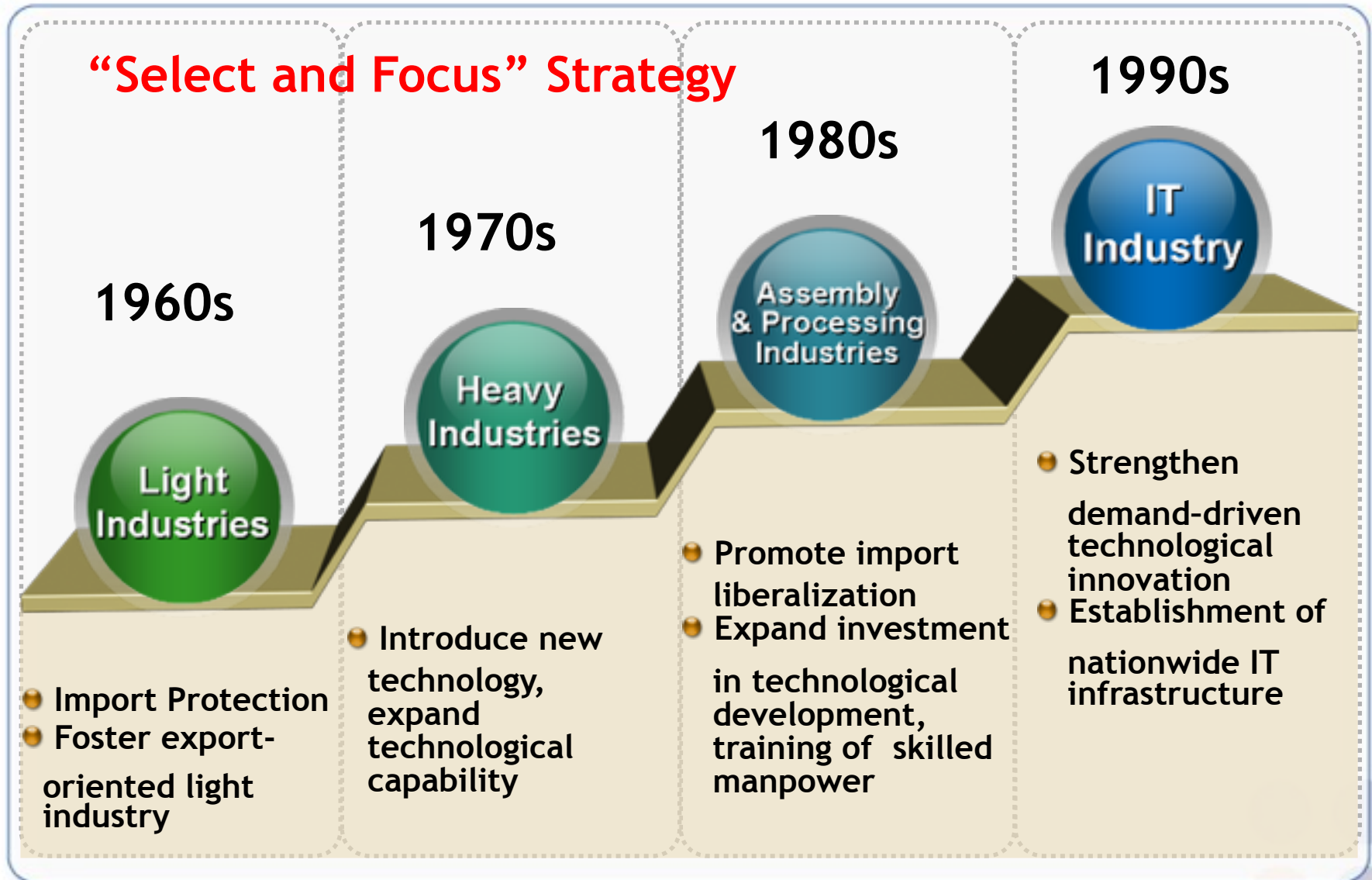
- Korea emerging from one of the poorest agrarian economies into an industrialized country, mainly through **an outward-oriented industrialization**.

GDP per capita (Current price, US \$) by country



- PPP-adjusted per capita GDP in 2013 (in current international \$): Korea: \$33,140 vs Japan: \$36,316

Export-oriented Industrial Development

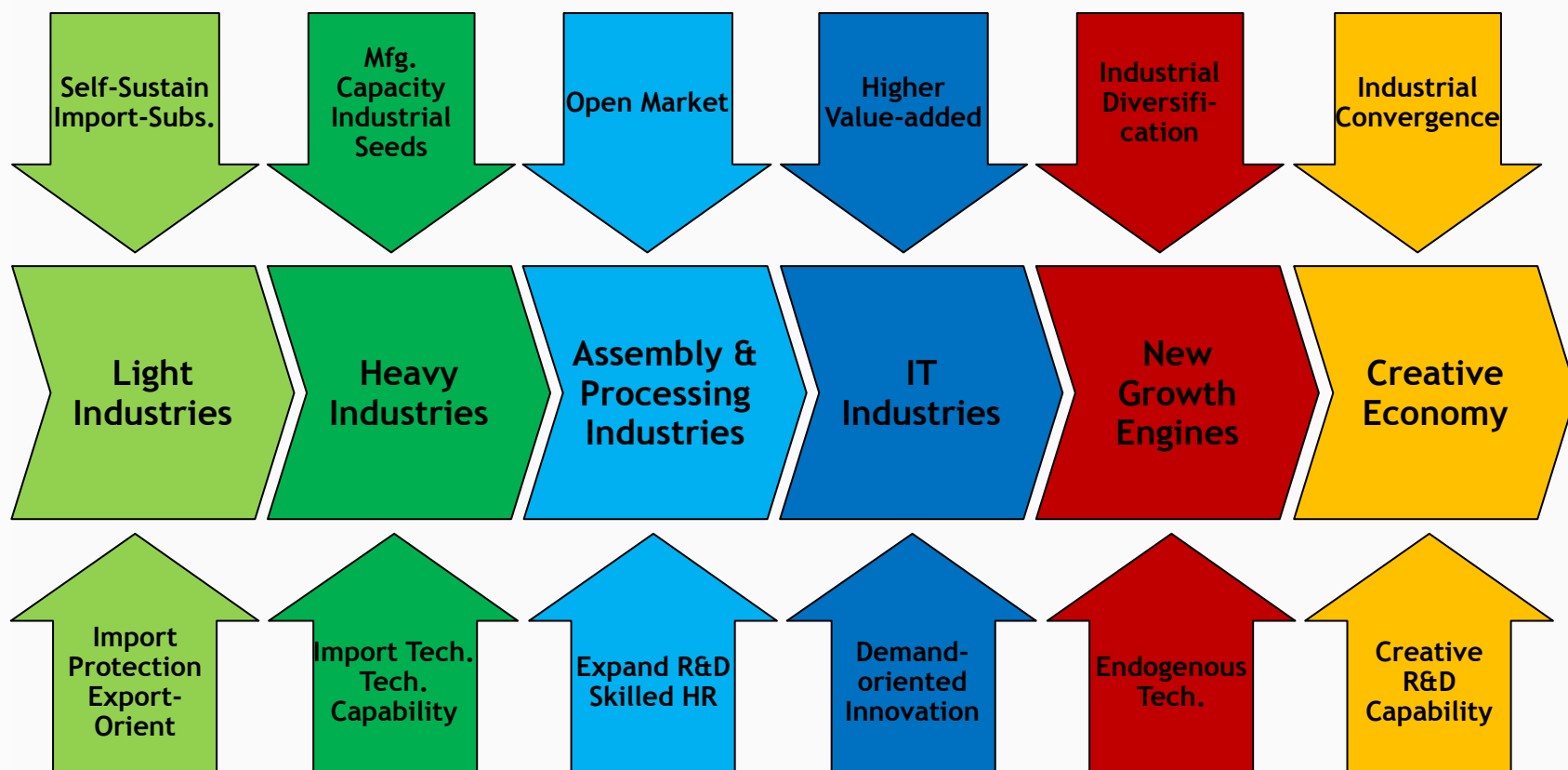




Korean STI Strategy: Meeting Industrial Demands

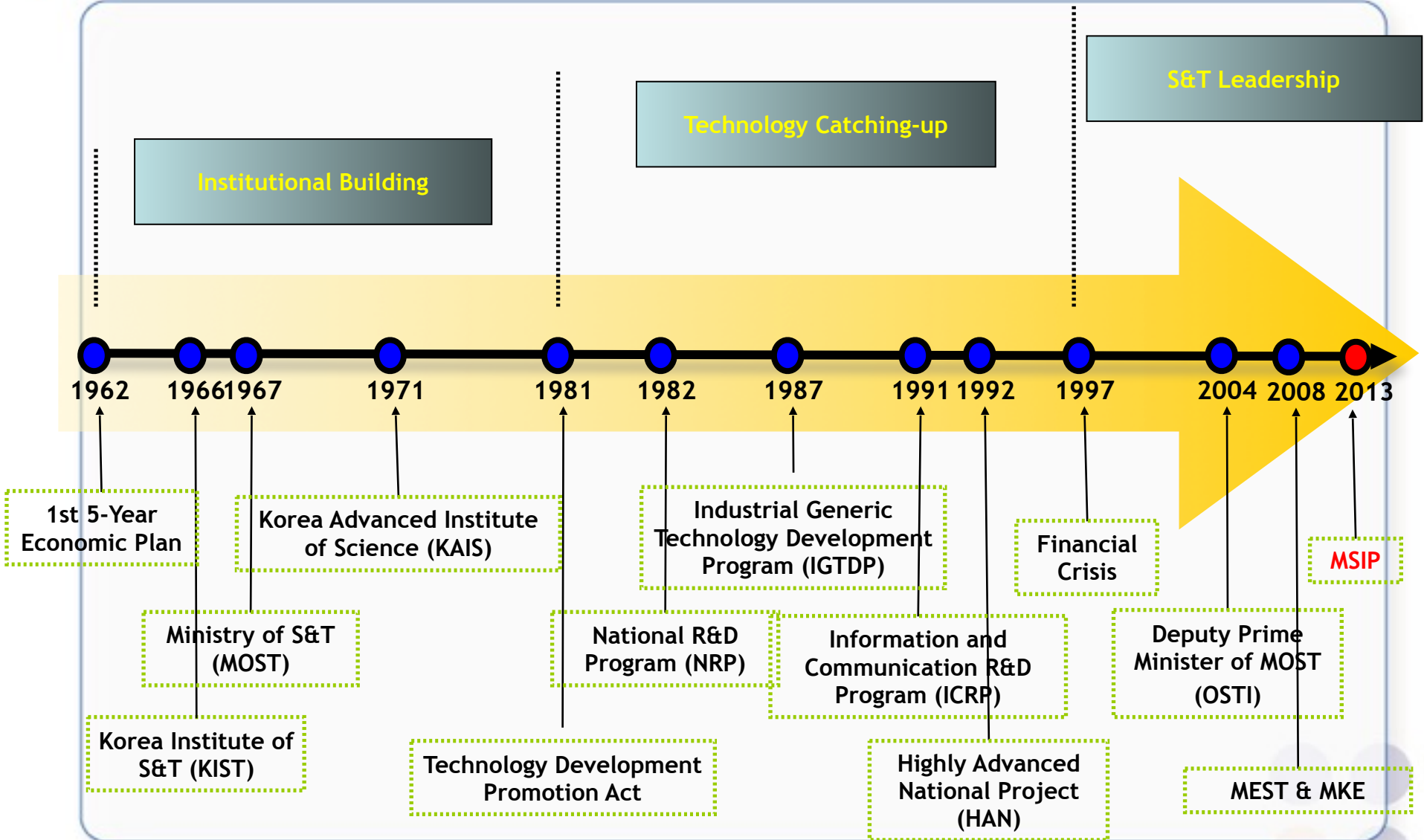
Demand Side

Industry-Oriented STI Strategy



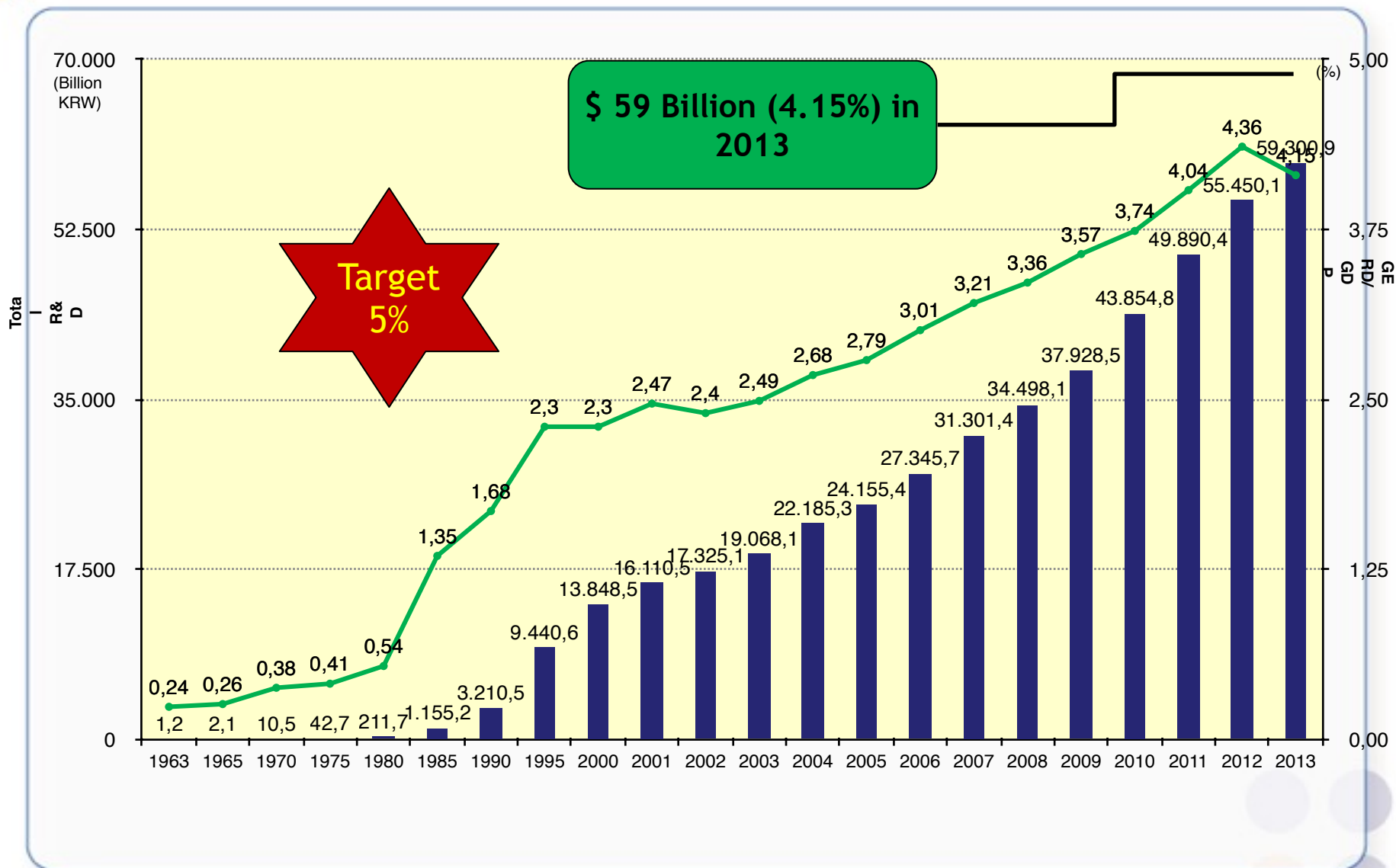
Supply Side

Paradigm Shift of Korean STI Policies





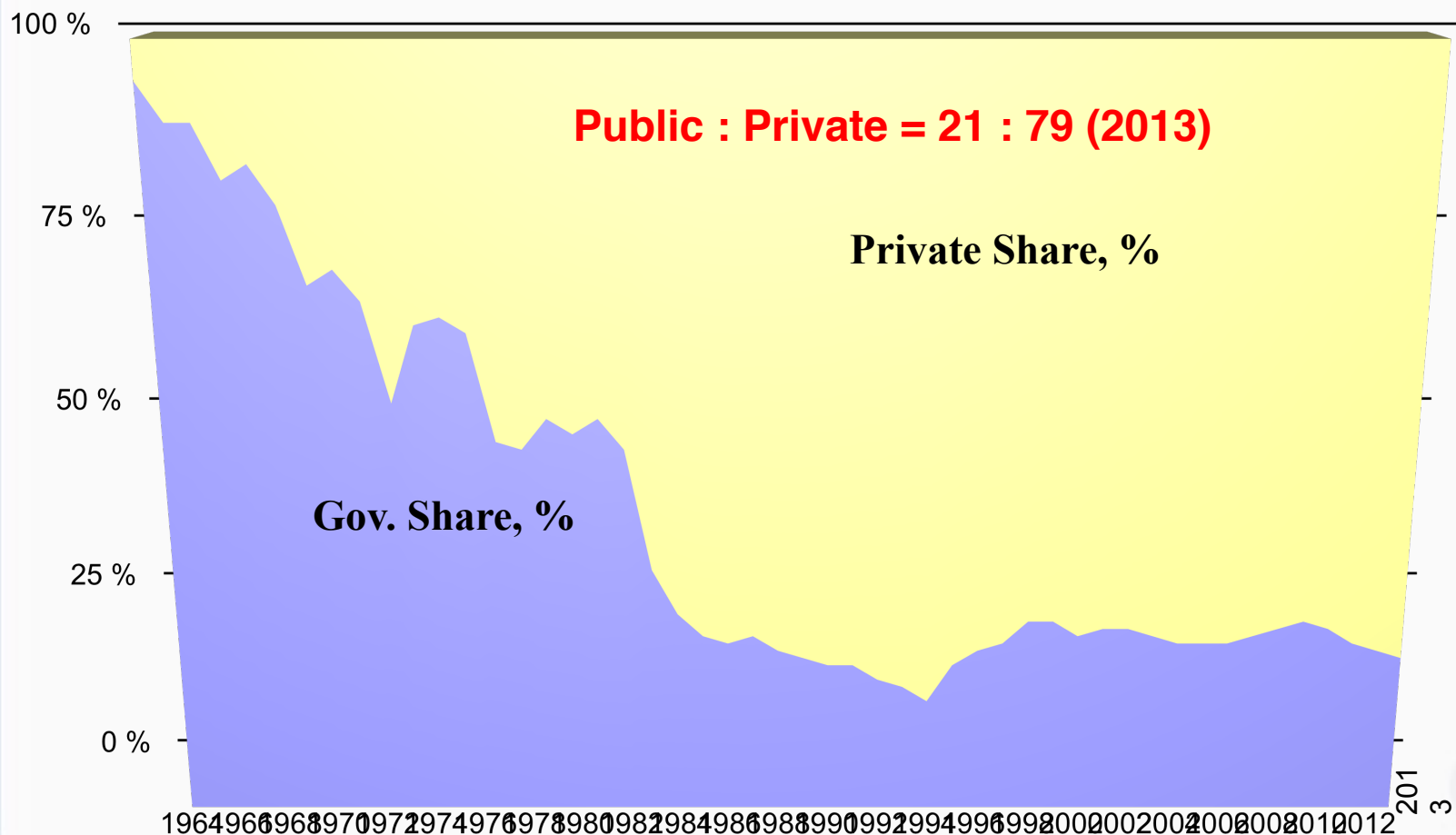
Trends of Total R&D Exp. and R&D/GDP in Korea





Trends of Public vs. Private R&D Investment in Korea

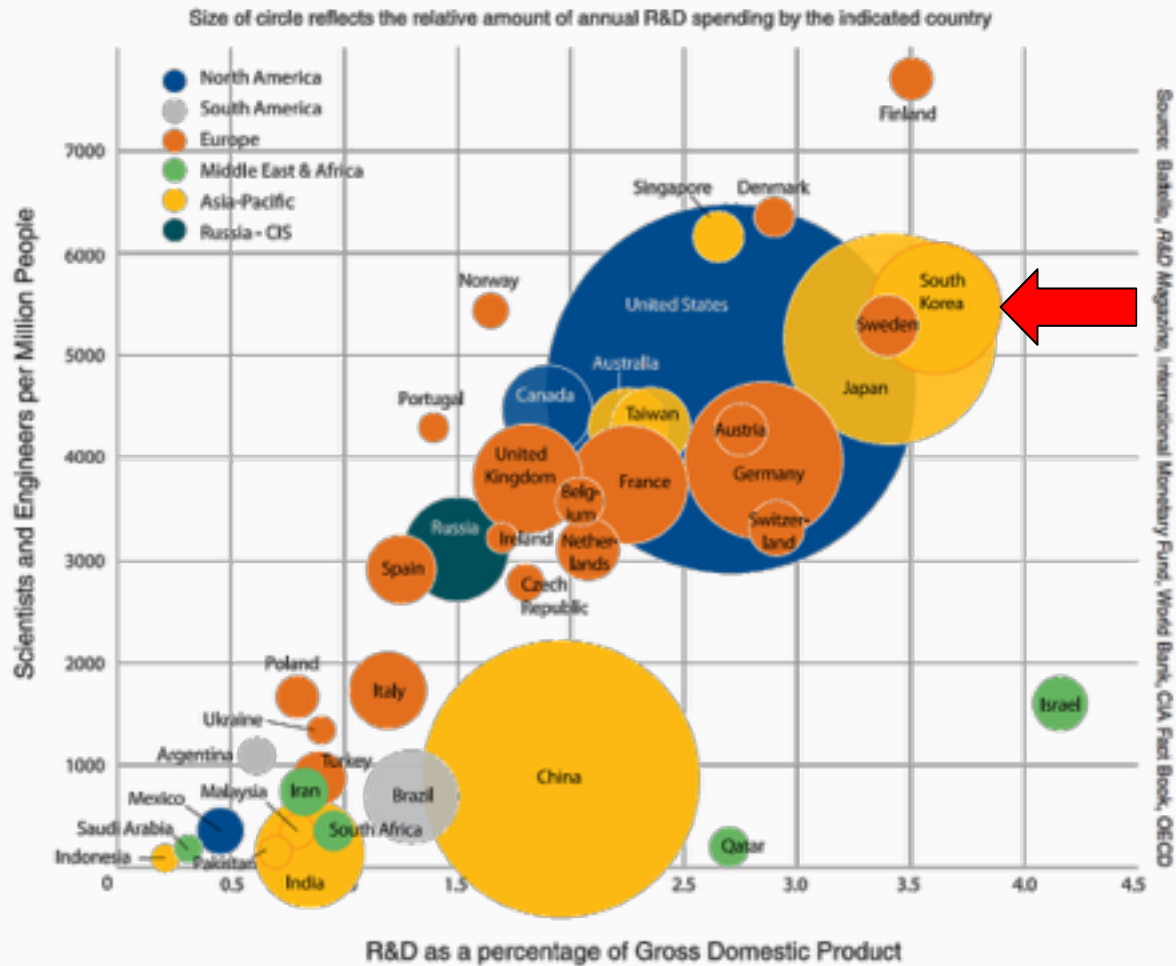
Public R&D: Promoting Private R&D





Korea in Global R&D (2013)

WORLD OF R&D 2013

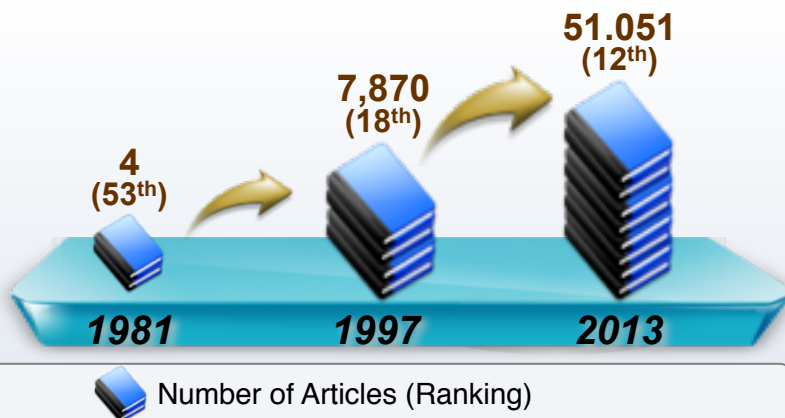


Source: 2014 Global R&D Funding Forecast, Battelle (2013)

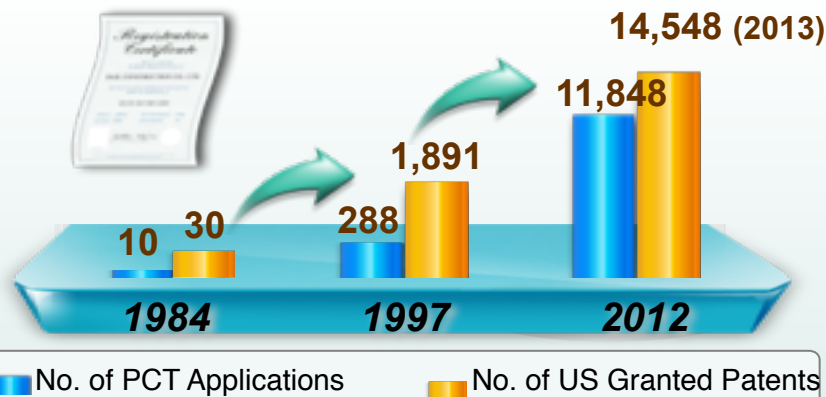


Major S&T Achievements

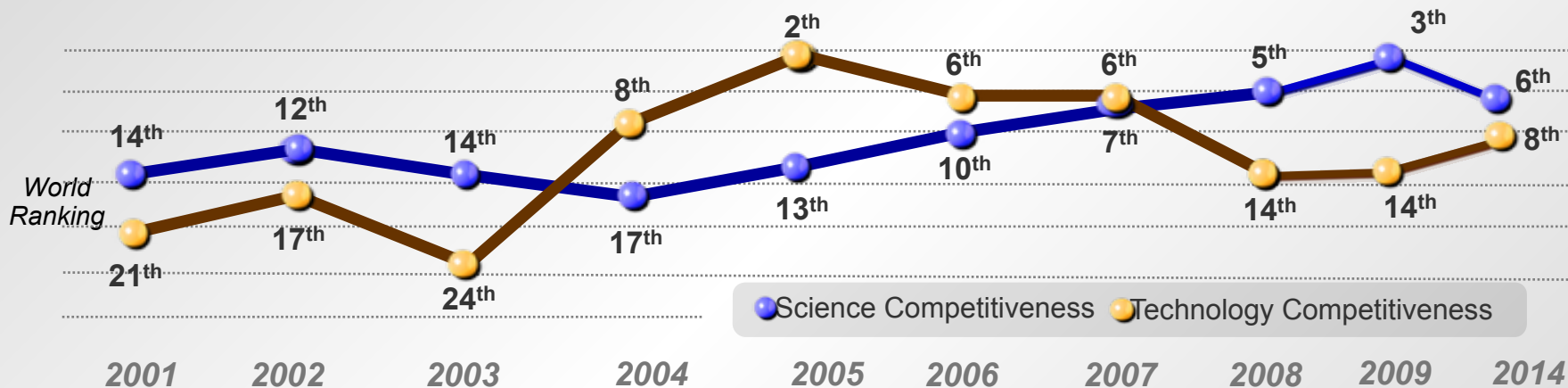
Science & Technology Articles



International Patents



Science & Technology Competitiveness (IMD)



Characteristics of Korean Strategies I

- **Policy Coordination towards National Development**
 - Economic Policy + Industrial Policy + STI Policy
 - STI Policies supported Economic & Industrial Dev. Strategies
 - Meeting Industrial Technological Demands
 - Facilitated and Encouraged Private R&D Investment & Innovation
- **‘Select and Focus’ Strategy (Strategic Selectivity)**
 - Not an Option but a Must Strategy
 - Under the condition of scarce natural resources and limited financial resource
 - Selected and Focused on Decadal Strategic Industries
 - STI Policies focused on providing necessary industrial tech.
- **Export-oriented Growth Strategy**
 - Import-substitution Export-oriented Economic Development
 - Promoting Export in Strategic Industries
 - Need World-class Technological capacities

Characteristics of Korean Strategies II

- **Critical Mass (Economy of Scale)**
 - Critical Level (not sufficient) of Budget Secured
 - for any Initiative or Program
 - through Budget Process
- **Strategic Approach (Planning for Implementation)**
 - Comprehensive Plan for Long-term Vision
 - followed by Mid-term Plan,
 - Annual Action Plans with Budget Obligations, and
 - Monitoring and Evaluation on Implementation
- **Education!**
 - High Fever on Education (College Enrollment Rate = 72.5% in 2011)
 - Confucian Tradition: Scholars - Farmers - Manufacturers - Merchants
 - Could successfully provided necessary skilled HR, Technicians, High-Caliber S&Es for STI

Characteristics of Korean Strategies III

- **Leading Players (Champions)**
 - EPB (Min. of Economy) for National Development Strategy
 - MOST for STI Policies
 - GRIs for Technological Advancement
 - Chaebols for Private Sector
- **MOST (Ministry of Science and Technology)**
 - Established in front (1967) to build and orchestrate STI institutions, resources and players
 - Promoted to the level of Deputy Prime Minister Level later
- **GRIs (Government-sponsored Research Institutes)**
 - Semi-Public Entities: Not Civil Servants but Private Professionals
 - Away from bureaucracy towards Autonomous Operation
 - KIST (1966) and 26 Spin-offs
- **Policy Think-tanks and Managing Agencies**
 - For Professional Development and Implementation of Policies
 - Supporting Rational Policy Decisions & Enabling Strategic Approaches



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Diagnosis on Chilean Innovation System I

- **Resource-driven Economy**
 - The Most Developed Economy in Latin America
 - The Only OECD Member in South America
 - Strong Free Market Economy & High level of Global Openness
 - But, Still a Resource-driven Economy
- **Relatively Strong Science Bases**
 - Few but Well-established Top Universities
 - CoEs in Universities Playing Major Role in Research
 - Strong Natural Sciences (esp., in Biology and Astronomy)
 - But, Weak linkages with Industrial Technological Demands
- **Limited Innovation Demands**
 - Various programs available to foster innovation in private sector
 - But, weak innovation capacity in private sector (R&D expenditure in private sector/GDP: 0.13%)
 - Limited demand for R&D and innovation (5.4% of univ.'s R&D funding is coming from private sector)

Diagnosis on Chilean Innovation System II

- **Coordination Failure due to Unclear Roles & Functions**
 - Well-designed diverse programs at CONICYT, CORFO and others
 - But, they are similar and duplicated
 - Coordination Failure among policies and programs
- **Lack of Critical Mass**
 - Rapid growth of R&D investments
 - But, \$1 B (0.39% GERD/GDP) on R&D still too small
 - Lack of critical mass to achieve policy goals
 - R&D project funding dispersed to reach many researchers in small scale
- **Lack of Strategic Approach**
 - No coherence in selecting the strategic sectors
 - Horizontal Approach in allocating research funds => Failed in creating critical mass



Diagnosis on Chilean Innovation System III

- **Weak Capacities at both the Individual and Institutional Levels**
 - Researcher- or project-based support without continuity
 - Too many sliced funding sources for the similar goals
 - Failed in internalizing & institutionalizing R&D and Technology Transfer capacities
- **Weak Regional Innovation Capacities**
 - No clear governance system for regional innovation
 - Few regional STI resources are concentrated in a few regions(e.g., the Metropolitana, Biobio, and Valparaíso regions)
 - Weak coordination between central and regional STI policies



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Policy Implications for Chile I

- **Building STI Institutional Framework**
 - Promoting Shared Vision
 - Need for Strategic Approach by setting goals, targets and actions for effective implementation
 - National Development Plan, Basic STI Plan, Action Plan, etc.
- **‘Select and Focus’ Strategy**
 - Selecting strategic industries at the system level
 - Strategic and improved allocation of the Increased R&D investment to achieve critical mass
- **Dramatic Expansion of R&D Investment**
 - Critical mass is prerequisite for effective outcomes
 - Reaching 1% R&D intensity during this Administration
 - Reaching OECD avg. of R&D intensity by 2030

Policy Implications for Chile II

- **Industrial Policy for Demand-based Innovation**
 - For sustainable growth, strong basis of industries desirable
 - Industrial development creating strong technological demands for innovation
 - Comparative Advantage vs. Strategic Advantage
 - Diversification around existing industries + Creating New Strategic Industries
- **Promoting PRIs**
 - For Demand-oriented R&D(industrial R&D)
 - For Institutionalizing R&D Capacities
 - For Providing Quality Jobs for High-caliber S&Es
 - Achieving critical mass in larger scale
- **Strengthening Policy Capacities**
 - Establishment of STI Policy Think-tank
 - To support robust policy making (evidence-based policy making)
 - To institutionalize policy analysis capacities

Policy Implications for Chile III

- **Developing Regional Innovation Parks**
 - Regional Innovation Parks = Industrial Park + Techno Park
 - For Regional Innovation and Balanced Development
 - Also support policy planning relating to regional strategic industries
 - Towards Regional Inclusive Innovation
- **Strengthening Public Policy Governance**
 - Streamlining and Strengthening STI Policy Governance
 - Strengthening coordination among policies and programs
 - Clarifying roles & functions of each institution

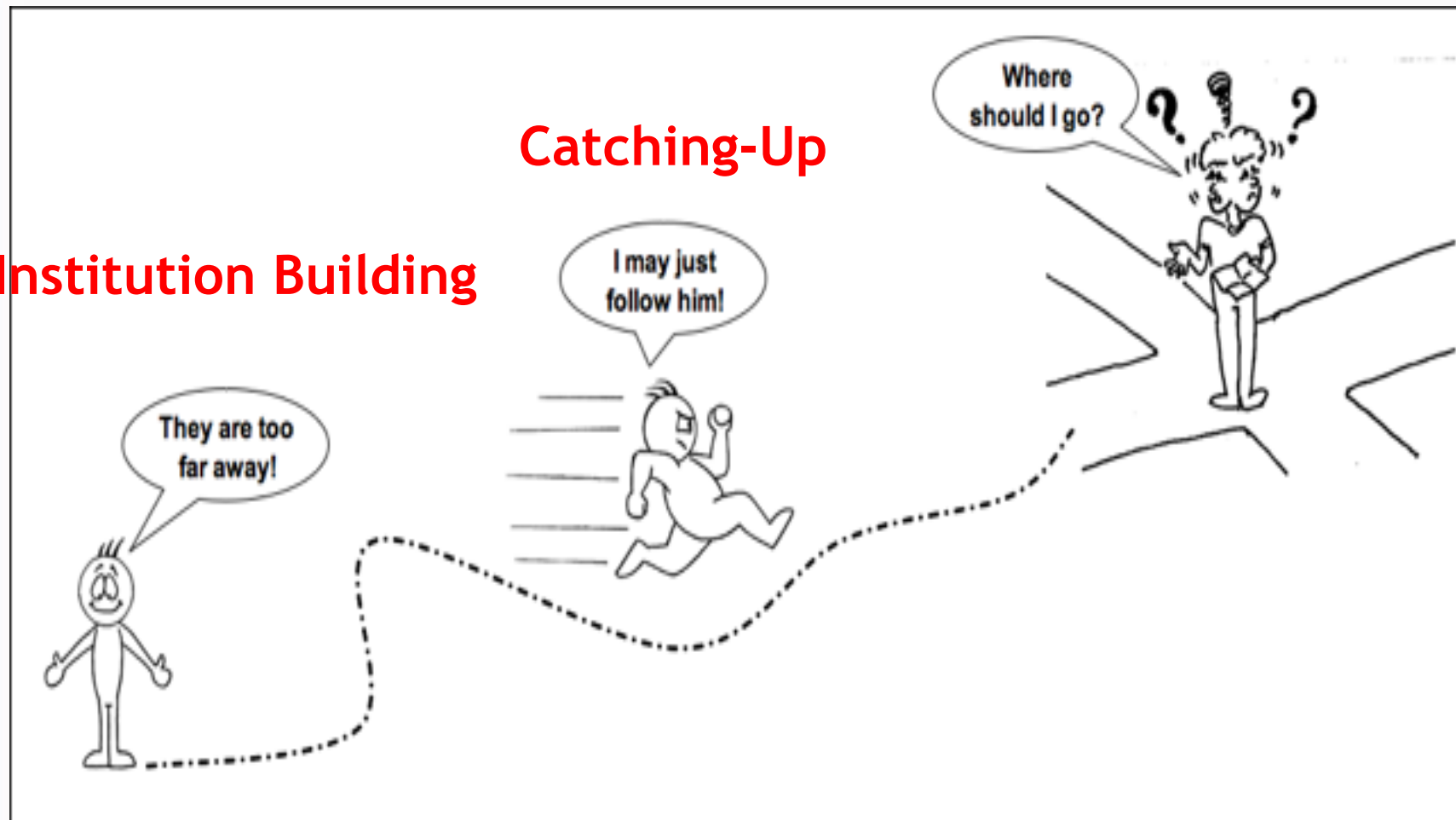


Innovation Strategies at Different Development Stages

STI Leadership

Catching-Up

Institution Building





Thank You!

Muchas Gracias!